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vision of the Archæan of the Minnesota Survey, which would correspond with the Upper Algonkian of the U. S. Geological Survey. The gold occurs (1) in segregated veins, (2) in fissure veins and (3) in fahlbands.

The segregated veins seem to resemble in all respects the veins which carry the greater part of the gold in the Appalachian region, at least, from North Carolina to Alabama. The quartz of these veins in lenticular masses is disposed in irregular belts from one to ten or more feet in width, which are roughly parallel with the lamination of the enclosing slates, and it is often the case that the gold is also found in the quartzose rock immediately enveloping the lenses. This agrees well with what has been noticed in the Southern Appalachian fields; and in the prospects of the Rainy Lake area as a gold-producing region there is also a close agreement with what has recently been given out as the conclusion of Prof. Becker regarding the Southern Appalachians, viz., that while the winning of the gold will probably never be of the nature of a bonanza, yet it will, if properly managed, yield a good interest upon the money invested. Apart from the gold-bearing veins, the resources of this region most to be counted upon for future development are (1) the excellent farming lands, (2) the large bodies of good timber, (3) the large water power and (4) the probability of the existence of valuable deposits of iron ore.

Part IV. is a well considered paper by W. R. Hoag, on the Advantages to be Derived from a Topographic Survey of the State. In Part V. Professor Winchell gives a historical sketch of the Discoveries of the Mineral Deposits of the Lake Superior Region, including some interesting details of the prehistoric mining in the copper regions. In this sketch attention is called to the important fact that the majority of the metaliferous belts were discovered by official

geologists in the performance of their assigned duties. Among these discoverers the name of Dr. Douglass Houghton stands preëminent.

Part VI., by Mr. Warren Upham, is in continuation of an investigation published in the preceding report of this survey, and relating to the glacial lakes which are now succeeded by the present great Laurentian lakes. The author brings forward evidence to prove the pre-glacial elevation of North America, the late glacial subsidence, and the reëlevation by a wavelike epeirogenic uplift. The measurement of post-glacial time by the recession of Niagara Falls is also fully discussed, the conclusion reached that the estimate of 7,000 years, made by Gilbert in 1886, accords best with the facts observed. The paper ends with a tabular presentation of the epochs and stages of the glacial period, using the nomenclature proposed by Professor Chamberlin.

The rest of the volume is devoted to notes upon some Minnesota minerals, to chemical analyses, lists of rock samples, etc., without general interest, except some notes by Professor Winchell upon the bedded and banded phases of the gabbro of northeastern Minnesota.

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FOLK-TALES.

Le Folklore Dans Les Deux Mondes. Par LE CONTE H. DE CHARENCEY. Paris, C. Klincksieck. 1894. Pp. 424.

Louisiana Folk-Tales. In French Dialect and English Translation. Collected and Edited by ALCEE FORTIER, D. Lt. Houghton, Mifflin & Co. 1895. Pp. 122.

The work of M. de Charencey forms the twenty-third volume of the 'Actes de la Société Philologique,' a society, by the by, which in its various issues presents a great deal of value on American languages. The author, well known for his numerous and erudite writings, here takes up a series of

myths and folk-tales which are found in tribes and nations widely asunder in time and place, and points out the traits which he believes to be original, and those he considers assignable to contact. The majority of them are either American or represented in America. The longest, 135 pages, is that which he calls 'Lucina sine concubitu,' *i. e.*, the Myth of the Virgin-Mother. As he shows, this is a very common tale repeated with slight variations in the New and Old World. Another of special interest is that of the subterranean origin of the human species, which is connected with the flood-myth and various cosmogonical legends. Other chapters are devoted to 'The Origin of the Sun,' 'Dog-Men,' 'The Myth of Psyche in America,' 'The Discovery of Maize,' 'The Name of the Metals in the Languages of Mexico,' etc.

The learning of the author is everywhere manifest and also his familiarity with original sources and native languages; but to one who believes in the modern anthropologic school of folk-lore his constant effort to trace connection and dependence between myths of distant nations will prove disappointing. He is a firm believer in the fanciful theories about early American culture advanced by the late M. Leonce Angrand, who maintained there were two currents of civilization, one the 'Floridian or eastern Toltecs,' the other the 'western Toltecs'; the former from southern, the latter from central or northern Asia. No tenable arguments support this hypothesis, and its introduction into a work of original research, such as this, is a misfortune.

Professor Fortier's volume is the second of the 'Memoirs of the American Folk-lore Society.' It consists of fourteen animal tales, twelve fairy tales or *märchen*, and an appendix of fourteen short stories in English only. Some brief notes accompany the text, mentioning the source or informant. Most of the tales can readily be traced to

European originals, which have become modified by the local surroundings. The few exceptions to this are possibly African, but the negroes in the United States seem to have lost early and completely both their language and folk-lore. The volume is also valuable for its examples of the true Creole dialect. This is now disappearing, and Professor Fortier found it no easy matter to obtain these narratives, the younger generation knowing nothing of them and the older being desirous of forgetting them.

The translation is generally very satisfactory; though in such renderings as 'alors pove fille la di,' by, 'the young lady said to herself,' greater simplicity would have been preferable.

D. G. BRINTON.

The Second Law of Thermodynamics. PROFESSOR OLIVER J. LODGE, Proceedings, Liverpool Engineering Society, December, 1894, twenty-first session, with discussion.

Professor Lodge, in this discussion, begins with the statement that the Second Law of Thermodynamics asserts that the proportion, range of temperature worked through by a heat engine divided by initial maximum, absolute temperature, represents the largest proportion of the heat present in the working substance in any cycle of thermodynamic action which can be, by any means, converted from the thermal form of energy to the mechanical or dynamic, and proceeds to show that "the second law of thermodynamics is, after all, nothing more than enlightened common sense." The deduction is immediate and obvious that the higher the temperature the greater the availability of the heat, and the larger the proportion which may be converted into the other form of energy in any thermodynamic cycle. The drop of temperature between firebox and boiler, for example, means an absolute loss of availability of heat, in the

proportion of the difference between the final range between the boiler and atmosphere or other lower limit of temperature and the range between the firebox temperature and the same lower limit. If the absolute furnace temperature is 2000°C. , boiler temperature 500°C. , and condenser temperature 350° , for example, the availability of the heat generated by combustion is reduced at the first step from $(2000-350)/2000 = 0.825$ to $(500-350)/500 = 0.30$; even though the most perfect of thermodynamic engines is employed.

"But though the second law is scientifically precise and incontrovertible, it is hard at first to realize how and why it can be true that the temperature which exists in bodies so entirely controls its availability or working power." This the author proceeds to explain by reference to illustrations in other fields of energetics. The deduction follows:

"The transferable portion of heat is to the whole heat as the available difference of temperature is to the whole temperature above absolute zero. Hence the efficiency of transfer is equal to the ratio of the available difference of temperature to the maximum absolute temperature."

This is Professor Lodge's enunciation of the second law of thermodynamics. It follows that "A working substance above average pressure has some available mechanical energy; a working substance below average temperature has some available thermal energy, but a substance at average pressure and temperature has no available energy."

"The second law of thermodynamics relates to the utilization of heat energy as *heat*, *i. e.*, as irregular and uncontrollable molecular motion. If, by any means, molecular motion could be taken under control, it would cease to be heat—the second law of thermodynamics would not apply to it—and a much greater portion of its energy

might become available." Thus "Animals do not turn their food energy into heat, but utilize it direct. They are not heat engines. If they were, they would be miserably inefficient because of their low temperature; but they are chemical engines, analogous to the electric battery and are marvellously efficient."

A working substance, for use in any heat engine, must have the following qualifications to insure efficiency:

1. It must have great capacity for heat.
2. It must be able to sustain high temperature.

By utilizing the whole difference of temperature between the furnace and the surrounding bodies, any heat engine, as, for example, the gas engine, is seen to involve, according to the laws of thermodynamics, a possibility of raising the efficiency of the heat engine, "not five or six per cent., which is almost all the present difference between the best steam engines and the worst, but to a revolutionary change of fifty or sixty per cent; no drop of temperature being permitted from furnace to everyday temperature, without delivering up its due equivalent of motive power."

R. H. T.

SOCIETIES AND ACADEMIES.

ALABAMA INDUSTRIAL AND SCIENTIFIC SOCIETY.

THE annual meeting of this Society was held in Birmingham on the 8th instant. The officers elected for the ensuing year are Mr. Thomas Seddon, President, and Messrs. E. A. Uehling and C. E. Bowron, Vice-Presidents; Messrs. Eugene A. Smith and Henry McCalley were continued as Secretary and Treasurer respectively. The retiring President, Dr. Wm. B. Phillips, in his address before the Society, gave some particulars of the experiments conducted by him in Bessemer for the concentration of the Red Mountain (Clinton) ores. This